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CLAIMS:

1. A magnetic sensor device comprising a magnetic sensor element (11) on a substrate (10), at least one magnetic field generator (12) for generating a magnetic field on the substrate (10), characterized in that cross-talk suppression means (2) are present for
5 suppressing cross-talk between the magnetic sensor element (11) and the at least one magnetic field generator (12).
2. A magnetic sensor device as claimed in claim 1, in which the device is suited to detect the presence of at least one magnetic particle (15), the device further comprising a
10 sensor circuit (3) comprising the magnetic sensor element (11) for sensing a magnetic property of the at least one magnetic particle (15) which magnetic property is related to the generated magnetic field.
3. A magnetic sensor device according to claim 1, wherein the cross-talk
15 suppression means (2) comprises an electrostatic shielding device (31) between the magnetic sensor element and the magnetic field generator.
4. A magnetic sensor device according to claim 1 or 2, the at least one magnetic field generator (12) having a first frequency and the magnetic sensor element (11) having a
20 second frequency, wherein the cross-talk suppression means (2) comprises electrical frequency distinguishing means (23) for distinguishing between the first frequency and the second frequency.
5. A magnetic sensor device according to claim 1 or 2, the at least one magnetic
25 field generator (12) having a first frequency and a first phase and the output signal of the magnetic sensor element (11) having the first frequency and a second phase equal to the first phase and a phase shift caused by the cross-talk, wherein the cross-talk suppression means (2) comprises electrical phase distinguishing means (50) for distinguishing between the first phase and the second phase.

6. A magnetic sensor device according to any of the previous claims, wherein the magnetic field generator (12) comprises a conductor and an ac current source for generating an ac current flowing through the conductor.
- 5 7. A magnetic sensor device according to 6, wherein the direction (30) of the ac magnetic field is mainly perpendicular to the plane of the magnetic sensor element in the direct neighborhood of the magnetic sensor element.
- 10 8. A magnetic sensor device according to claims 1, 6 or 7, wherein a further magnetic field generator (12b) generates a second signal with a third frequency for compensating the cross-talk signal originating from the at least one magnetic field generator (12a) having the first frequency.
- 15 9. A magnetic sensor device according to claims 1, 6, 7 or 8, wherein a further magnetic field generator (12b) has an anti-phase current or an inverse voltage for compensating the cross-talk signal originating from the at least one magnetic field generator (12a) having the first frequency.
- 20 10. A magnetic sensor device according to any of the previous claims, wherein said at least one magnetic field generator (12) and said magnetic sensor element (11) are positioned adjacent each other above a substrate (10).
- 25 11. A magnetic sensor device according to any of claims 1 to 9, wherein said at least one magnetic field generator (12) is positioned between said substrate (10) and said magnetic sensor element (11).
- 30 12. A magnetic sensor device according to claims 8 or 9, the magnetic sensor element (11) lying in a plane, wherein said magnetic field generator (12) is positioned adjacent one side of the magnetic sensor element (11) and the further magnetic field generator (12') is positioned on the opposite side of the magnetic sensor element (11) at a same position with respect to a direction perpendicular (30) to the plane of the magnetic sensor element (11).

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13. A magnetic sensor device according to claims 8 or 9, the magnetic sensor element (11) lying in a plane, wherein said magnetic field generator (12) is positioned adjacent one side of the magnetic sensor element (11) and a further magnetic field generator (12') is positioned on the opposite side of the magnetic sensor element (11) at a same position with respect to a direction parallel to the plane of the magnetic sensor element (11).
14. A magnetic sensor device according to any of the previous claims, furthermore comprising means for determining a concentration of magnetic particles.
15. A magnetic sensor device according to claim 14, wherein the means for determining a concentration of magnetic particles comprises a plurality of magnetic field generators.
16. A magnetic sensor device according to claim 15, the magnetic sensor element lying in a plane, wherein the plurality of magnetic field generators are located at different levels with respect to the plane of the magnetic sensor element.
17. A magnetic sensor device according to any of the previous claims, wherein a flux guiding layer (38) is positioned between the magnetic sensor element and the at least one magnetic field generator on the one hand, and a substrate on the other hand.
18. A magnetic sensor device according to any of the previous claims, wherein the magnetic field generator (12) and the sensor circuit (3) form an integrated circuit.
19. A magnetic sensor device as claimed in claim 18, wherein the sensing circuit (3) comprises a storage means (33).
20. A magnetic sensor device according to any of the previous claims, wherein said magnetic sensor element is a magneto-resistive sensor element.
21. A magnetic sensor device according to any of the previous claims, wherein the at least one magnetic particle (15) is a magnetic label coupled to a biological molecule.

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22. Use of the magnetic sensor device as claimed in any of the previous claims for molecular diagnostics biological sample analysis, or chemical sample analysis.